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(54) Device for transferring and metering a flowable agricultural chemical from a reusable container into a tank

(57) In the use of agricultural chemicals there is the need to transfer the chemical from a reusable container 1 into a spray tank 9 by means of a measuring container 5, a precise metering being achieved in that the measuring container 5 has a connection 4 which can be fitted to it directly, has a shut-off valve 3 and can be connected to a reusable container 1, in that a hose line 13 runs from the other end of the measuring container 5 and opens into a circulating line 10, associated with the tank 9, on the suction side of a Venturi nozzle 12, and in that the filled measuring container 5 can be decoupled from the reusable container 1 and can be connected in the inverted position to a rinsing-agent line 16, allowing it to be rinsed after emptying, or an air inlet 18 allowing the chemical in the measuring container to be drawn into the circulating line 10.

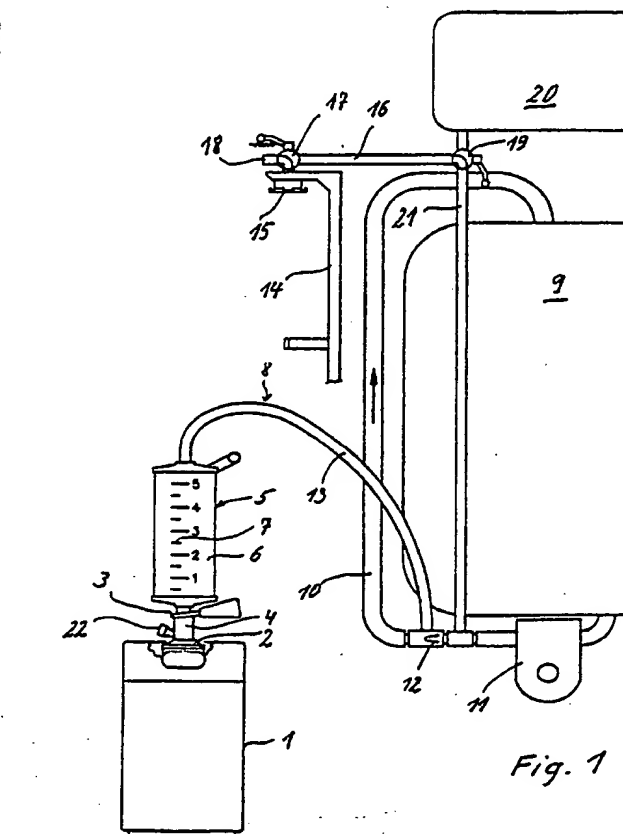
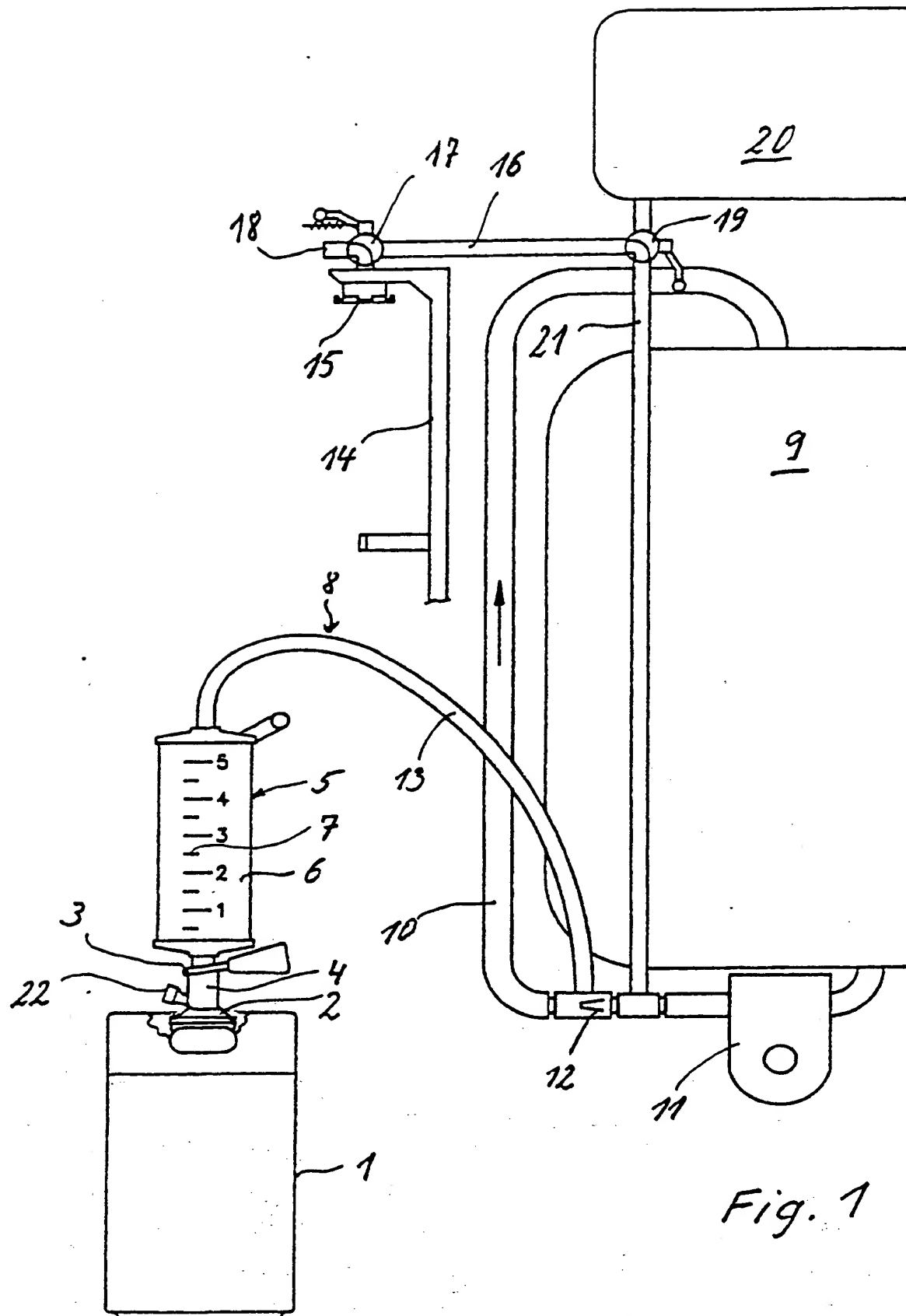


Fig. 1

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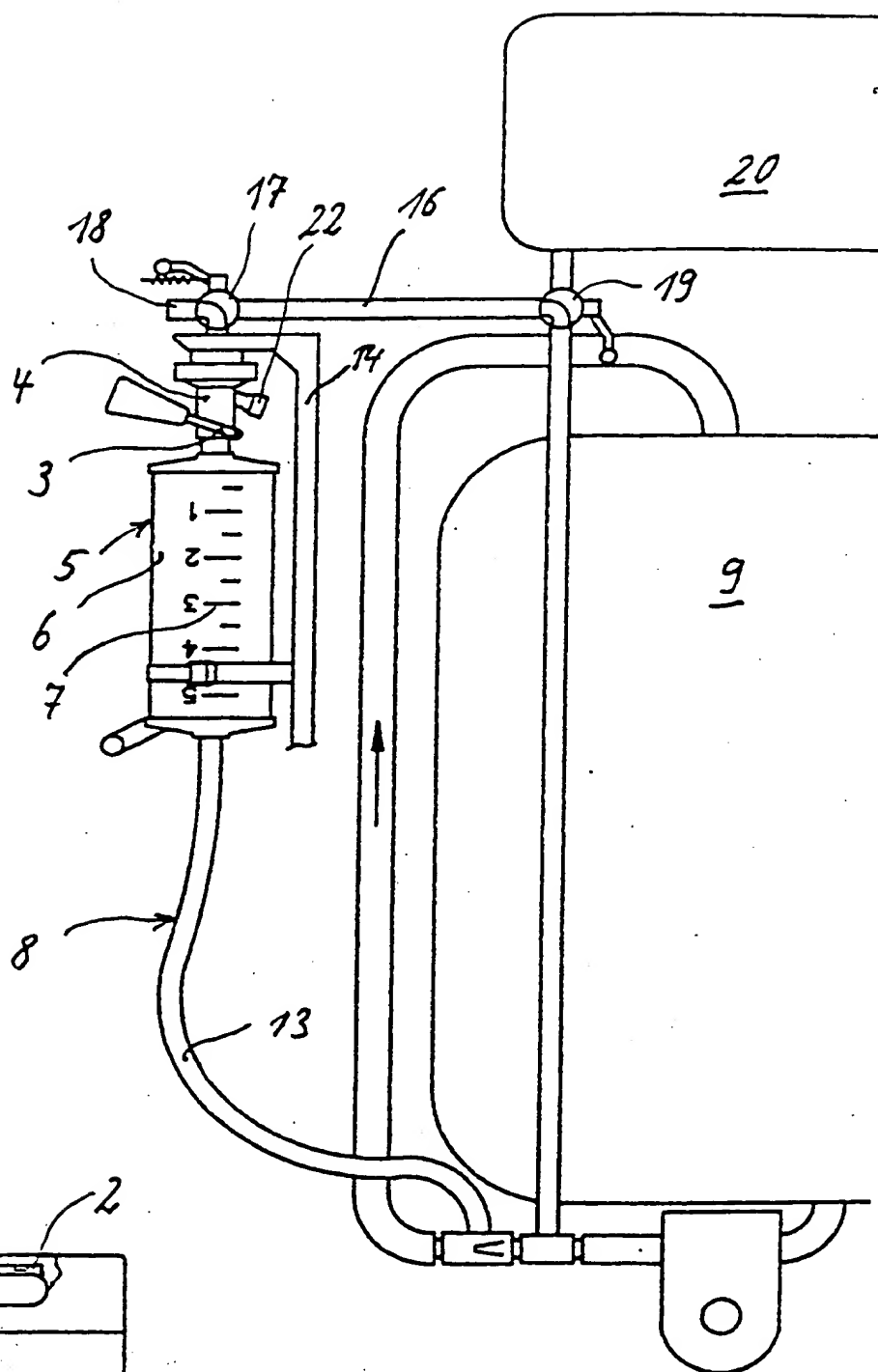
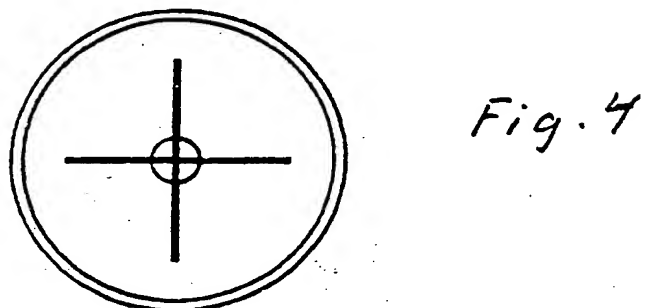
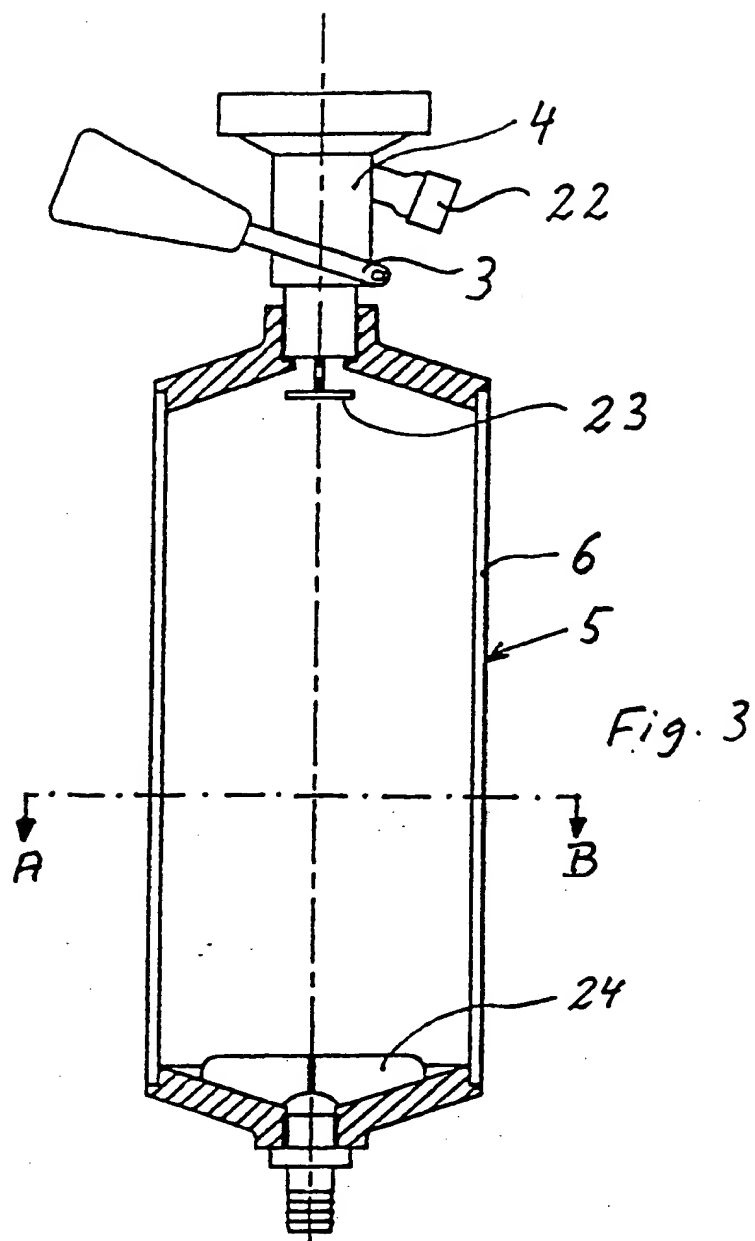


Fig. 2



**DEVICE FOR TRANSFERRING AND METERING A FLOWABLE AGRICULTURAL  
CHEMICAL FROM A REUSABLE CONTAINER INTO A TANK**

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5 The invention relates to a device for transferring and metering a flowable agricultural chemical from a reusable container via a ventable measuring container into a tank, it being possible to connect the measuring container to the reusable container by means of a connection, a connecting line being routed to the tank from said measuring container via a Venturi nozzle and a rinsing-agent line being associated with the measuring container.

10 In the case of commercially available devices of this type, the measuring container has a hose line with a connection for connecting to the reusable container, the said hose line opening into the base of the measuring container. The transfer from the measuring container into the tank takes place via a line which runs from the base of the measuring container via automatically or manually actuated valves. In this case it is not possible to measure the volume of the agricultural chemical contained in the  
15 connection and in the hose line. If the connection and the connecting line is in the normal manner, said volume is transferred into the tank. That is to say said volume has to be determined beforehand. If connection and hose line are not rinsed, said volume is not transferred, which naturally results in metering inaccuracies.

20 The object is to improve the device of the type mentioned at the outset in such a way that a precise metering is possible both with rinsing and without rinsing. This object is achieved in that

- a) the connection is provided with a shut-off valve and is fitted directly on the measuring container, in that
- b) the connecting line leading to the tank runs from that end of the measuring  
25 container which is remote from the connection and comprises a hose lin

which opens into a circulating line, associated with the tank, on the suction side of the Venturi nozzle fitted therein, a pump being fitted in said circulating line between its outlet from the tank and the Venturi nozzle, and in that

- 5 c) there is associated with the measuring container a holder which has a connection to a rinsing-agent line, to which connection the measuring container can be connected in the inverted position by means of its connection.

10 Because no hose line is present between reusable container and measuring container, there is virtually no uncheckable volume present on the feed side of the measuring container. The fitting of the Venturi nozzle in the circulating line makes it possible to pump the agricultural chemical out of the reusable container into the measuring container as a result of the suction action due to the circulation of the tank contents by means of the Venturi nozzle. After filling the measuring container and closing the shut-off valve, the connection of the measuring container can be  
15 uncoupled and coupled to the connection of the rinsing-agent line. This connection has attached to it a spring loaded changeover valve which initially allows air to enter the measuring container. As a result of venting the measuring container and recirculating the tank contents, the chemical discharging from the measuring container is concomitantly pumped into the tank, specifically without residue, apart  
20 from the wetting of the wall. If the spring loaded changeover valve is now operated by hand, rinsing can be carried out.

According to a first embodiment, the rinsing-agent line is connected to a clean-water inlet.

25 According to a second embodiment, the rinsing-agent line opens into the circulating line between pump and Venturi nozzle.

In the first case, rinsing takes place with pure water and in the second with the liquid contained in the tank.

A third embodiment combines both embodiments, a change-over valve being provided by means of which clean-water inlet or circulation can be selected.

5 A water supply system or a tank is used for the clean-water feed.

Preferably, the holder for the measuring container is provided with a retaining device so that it has a permanent position when not in use.

10 A distributor plate is preferably fitted inside the measuring container alongside the connector in order to distribute the rinsing liquid over the internal wall. Attachments are fitted at the outlet of the measuring container in order to suppress vortex formation during discharge.

It is also possible to shape the measuring container conically at least at the connection end so that fairly small quantities can be measured out more precisely.

15 The novel device is shown purely diagrammatically in an exemplary embodiment in the drawing and is explained in greater detail below. In the drawing:

Figure 1 shows the device with the measuring container in the filling position,

Figure 2 shows the device with the measuring container in the emptying position,

20 Figure 3 shows a section through the measuring container in an enlarged representation, and

Figure 4 shows a section through the measuring container along the line A-B in Figure 3.

5 A reusable container 1 is provided with a connection 2 to which the connection 4, provided with a shut-off valve 3 and air inlet 22, of a measuring container 5 can be connected. The measuring container 5 has a transparent wall 6 with scale 7, and from its other end, a connecting line 8 leads to a tank 9, the so-called spray tank. The latter is connected to a spraying boom, which is not shown. The tank 9 is provided with a circulating line 10, in which a pump 11 and a Venturi nozzle 12 are fitted. The connecting line 8 comprises a hose line 13 which opens into the  
10 circulating line 10 on the suction side of the Venturi nozzle 12. The further section of the connecting line 8 is formed by said circulating line 10. A holder 14, which at the same time has a connection 15 for connecting the measuring container 5 in the inverted position to the rinsing-agent line 16, is also provided for the measuring container 5. Fitted between connection 15 and rinsing-agent line 16 is a spring  
15 loaded two-way valve 17, biased towards an air inlet 18. The rinsing-agent line 16 runs from a water tank 20, which serves as clean-water feed, via a second two-way valve 19, it being possible to switch over said two-way valve 19 to a rinsing-line section 21 so that rinsing can also be carried out with the liquid contained in the tank 9 instead of clean water. At that end at which the measuring container 5 has the  
20 connection 2, it has a cover plate 23 on the inside for distributing the liquid. At that end to which the hose line 13 is connected, the measuring container 5 has fittings 24 on the inside which prevent vortex formation.

The mode of operation of the device is as follows:

25 With shut-off valve 3 closed, the measuring container 5 is coupled to the connection 4 at connection 2 of the reusable container 1 and the pump 11 is switched on. The shut-off valve 3 is then opened and, as a result of the vacuum generated by means of the Venturi nozzle 12 on pumping the tank contents round, the agricultural chemical is sucked into the measuring container 5. When the desired metered amount is reached according to scale 7 the shut-off valve 3 is closed. The



measuring container 5 is uncoupled from the reusable container 1 and connection 4 is coupled to the connection 15 of the rinsing-agent line 16. The two-way valve 17 is switched to venting and the agricultural chemical is pumped through the circulating line 10 into the tank 9. After emptying, the two-way valves 17 and 19 are switched  
5 over to clean-water rinsing, i.e. in such a way that clean water from the tank 20 flows through the two-way valve 19, the rinsing-agent line 16, the two-way valve 17, the connection 4, the measuring container 5 and the hose line 13 and is pumped by the Venturi nozzle into the tank 9.

As an alternative to this, the two-way valve 19 can be switched over to rinsing with  
10 the tank contents instead of clean-water rinsing by connecting the rinsing-agent line 16 to the rinsing-agent line section 21. In this case, the pump forces some of the liquid sucked in through the Venturi nozzle 12 and some flows via the line section 21, a two-way valve 19, the rinsing-agent line 16, the two-way valve 17, the connection 4, the measuring container 5, the hose line 13 and the circulating line 10 back into  
15 the tank 9.

It will of course be understood that the present invention has been described above purely by way of example, and that modifications of detail can be made within the scope of this invention.

**Claims**

1. Device for transferring and metering a flowable agricultural chemical from a reusable container (1) via a ventable measuring container (5) into a tank (9), it being possible to connect the measuring container (5) to the reusable container (1) by means of a connection (4), a connection line (8) being routed to the tank (9) from said measuring container (5) via a Venturi nozzle and a rinsing-agent line (16) being associated with the measuring container (5), characterised in that
  - a) the connection (4) is provided with a shut-off valve (3) and is fitted directly on the measuring container (5), in that
  - b) the connecting line (8) leading to the tank (9) runs from that end of the measuring container (5) which is remote from the connection and comprises a hose line (13) which opens into a circulating line (10), associated with the tank (9), on the suction side of the Venturi nozzle (12) fitted therein, a pump (11) being fitted in said circulating line between its outlet from the tank (9) and the Venturi nozzle (12), and in that
  - c) there is associated with the measuring container (5) a holder (14) which has a connection (15), by way of a changeover valve (17), to an air inlet (18) or a rinsing-agent line (16), to which connection the measuring container (5) can be connected in the inverted position by means of its connection (4).
2. Device according to Claim 1, characterised in that the rinsing-agent line (16) is connected to a clean-water inlet (20).

3. Device according to Claim 1 or 2, characterised in that the rinsing-agent line (16, 21) opens into the circulating line (10) between pump (11) and Venturi nozzle (12).
4. Device for transferring and metering a flowable agricultural chemical, substantially as hereinbefore described with reference to the accompanying drawings.

**Patents Act 1977**  
**Examiner's report to the Comptroller under Section 17**  
**(The Search report)**

Application number  
GB 9314515.9

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**Relevant Technical Fields**

- (i) UK CI (Ed.M)      B8N NKA, NKB, NKX, NV  
(ii) Int CI (Ed.5)      G01F 11/28, 13/00; B01F 5/04

Search Examiner  
MR S WALLER

Date of completion of Search  
17 OCTOBER 1994

**Databases (see below)**

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii) ONLINE DATABASE : WPI

Documents considered relevant following a search in respect of Claims :-  
1-4

**Categories of documents**

- |           |   |               |   |
|-----------|---|---------------|---|
| <b>X:</b> | Document indicating lack of novelty or of inventive step.   | <b>P:</b>     | Document published on or after the declared priority date but before the filing date of the present application.        |
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Category	Identity of document and relevant passages	Relevant to claim(s)
	NONE	

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